



US LHC ACCELERATOR PROJECT

brookhaven - fermilab - berkeley

FNAL - LHC Accelerator Project Status

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for the members of the Project Team

11 April 2005

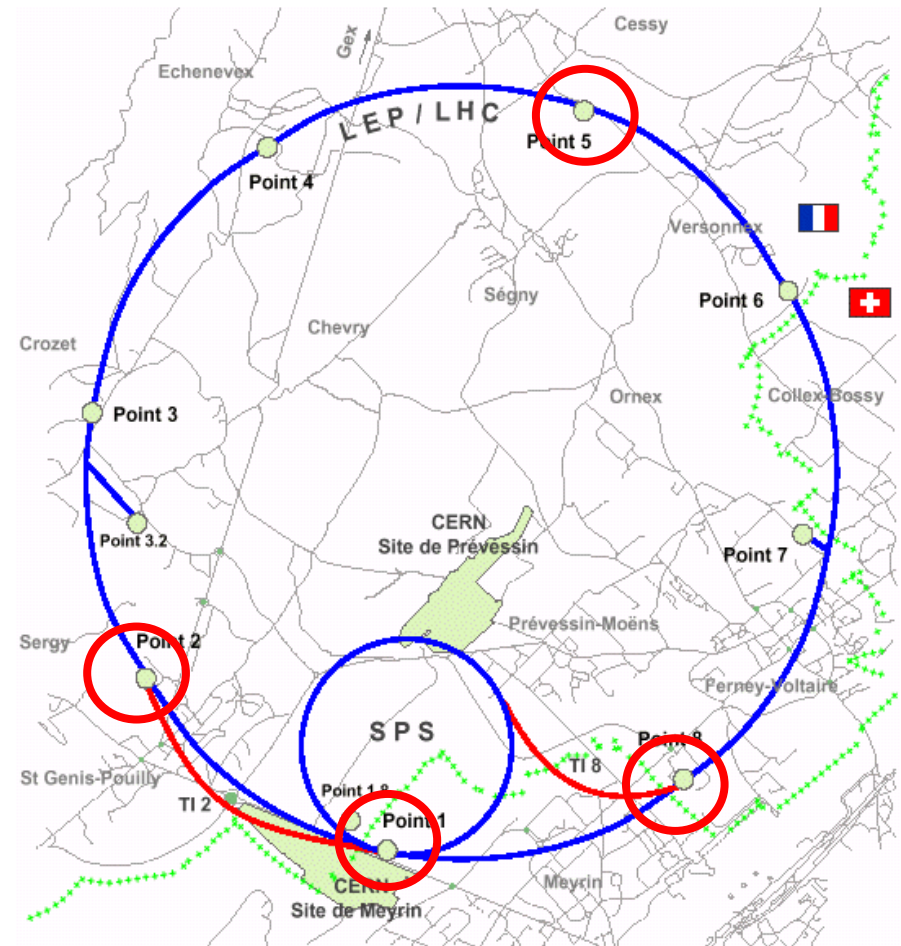


USLHC Accelerator Project

Fermilab provides overall management for the US-LHC Accelerator Project.

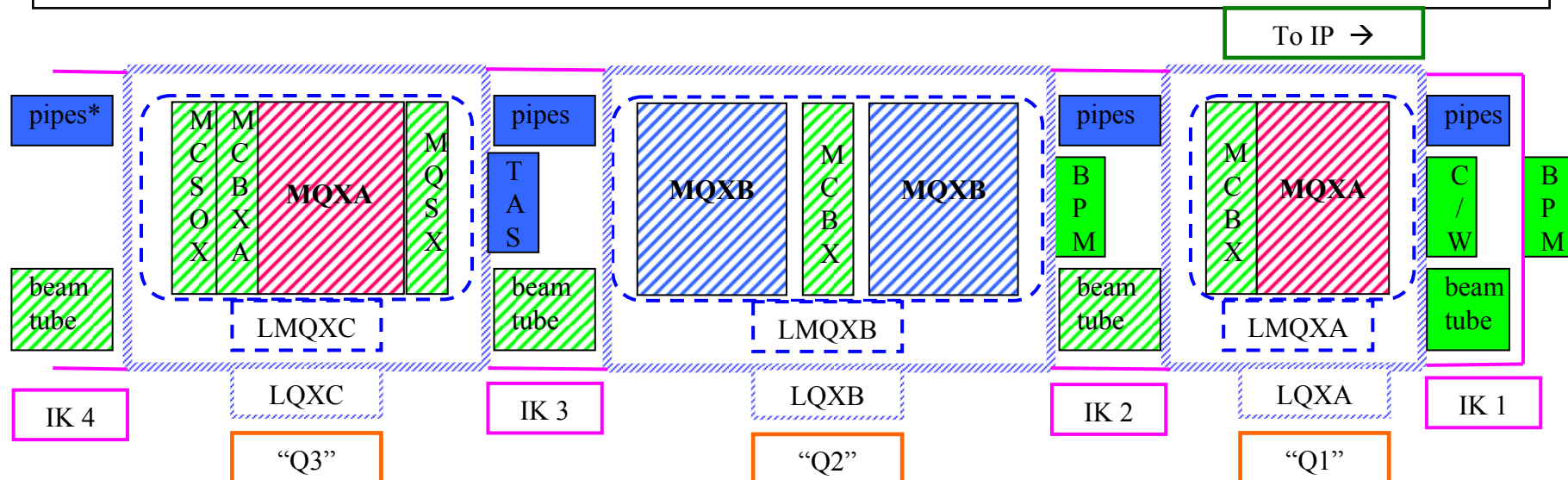
This is a collaborative effort of BNL, FNAL, & LBNL to design and build portions of the IR regions for the LHC

The Construction Project is nearly finished; LHC Accelerator Research Program (S. Peggs) continues Fermilab involvement in LHC machine





Scope



Fermilab:

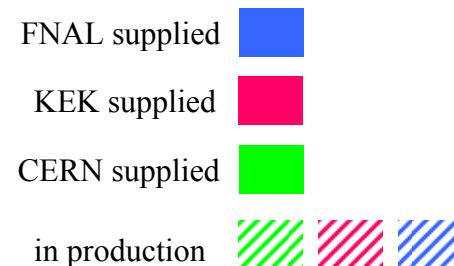
Designs, fabricates and tests the MQXB quadrupole magnet

Designs, fabricates, assembles and tests the LMQXx and LQXx Cryostats

Designs and procures portions of the Interconnect Kits, providing integration support for each

Provides Engineering and Test support for the DFBX

Provides Alignment and Energy Deposition Support for the inner triplet region



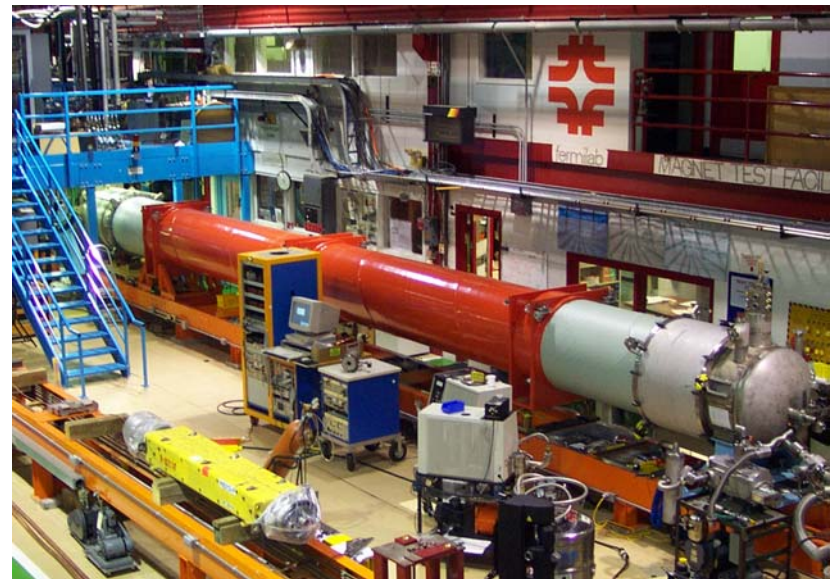


Fermilab – LHC Project

The IR Quadrupoles are the most technically challenging portion of the US Accelerator Project

Starting in 1996, Fermilab worked with CERN to develop the requirements and the design of the quadrupole

- Model Magnets were fabricated and tested in 1997-2000
- A full length prototype was successfully tested in 2001
- Production started later in 2001 and is approaching completion



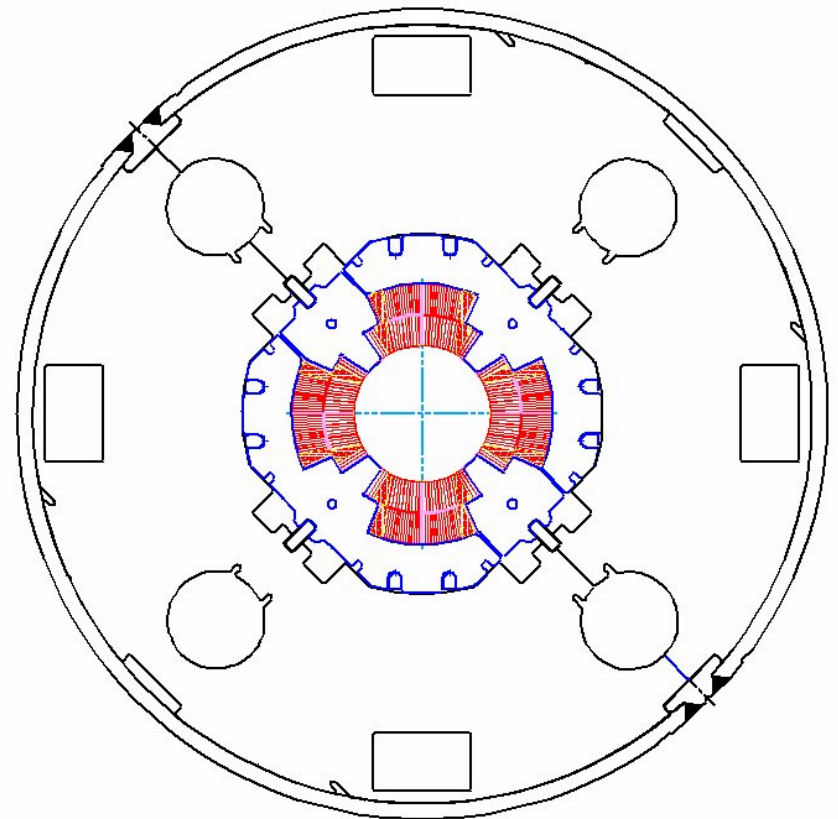


MQXB Magnet Design

Cold Mass Design

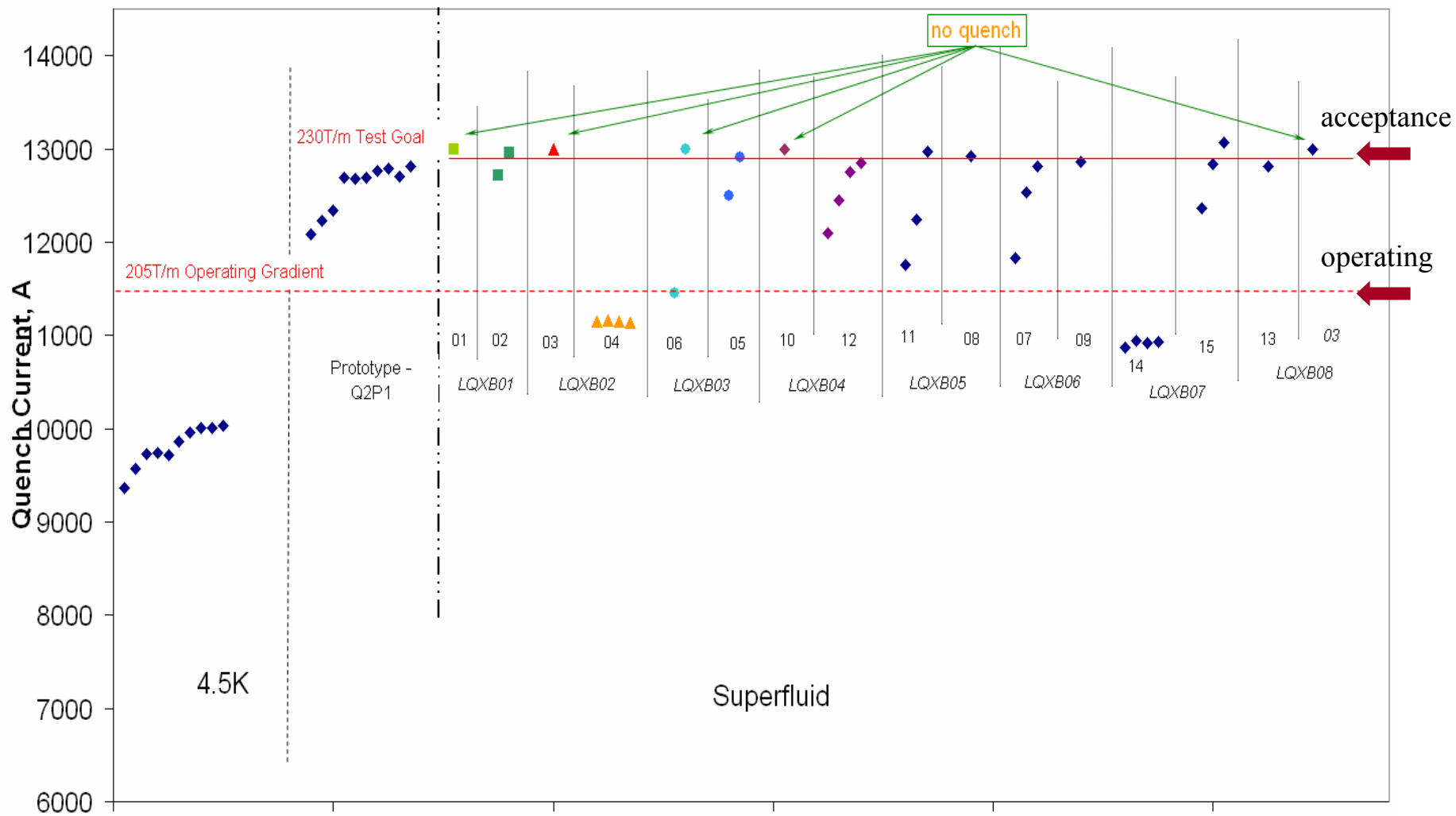
- Magnetic cross section in body unchanged
- 37 strand inner, 46 strand outer cables, from unannealed, uncoated NbTi strand
- 2 step coil cure cycle
- Standalone Nitronic 40 collars for support--target warm prestress 75MPa both inner and outer coils
- 2 piece iron yoke for flux return
- stainless shell for closure and helium containment

Combination of peak field ($>9\text{T}$) and required thermal margin pushes NbTi technology to the limit





MQXB Quench Performance



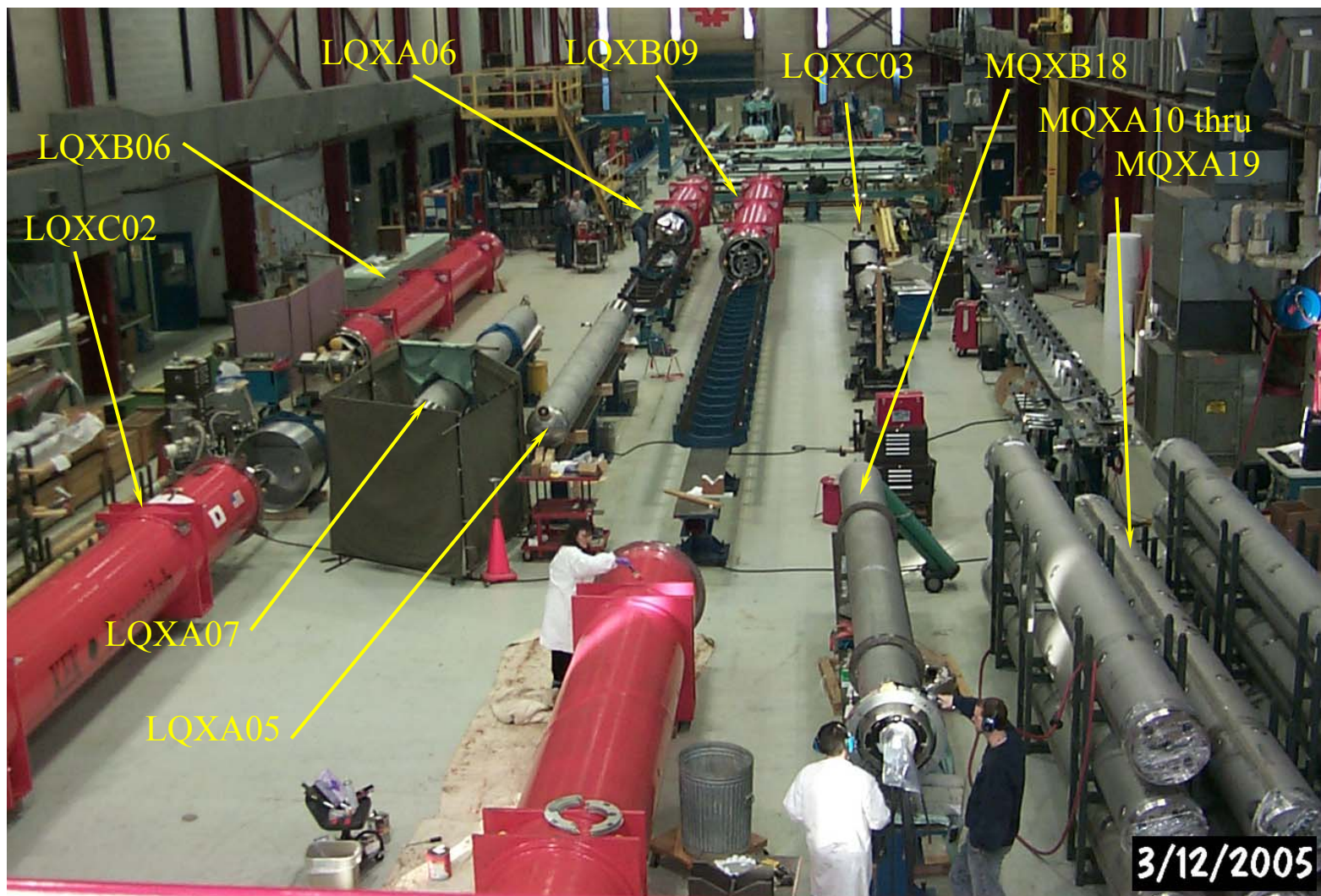


"Unlike anything I have seen before"—recent external reviewer



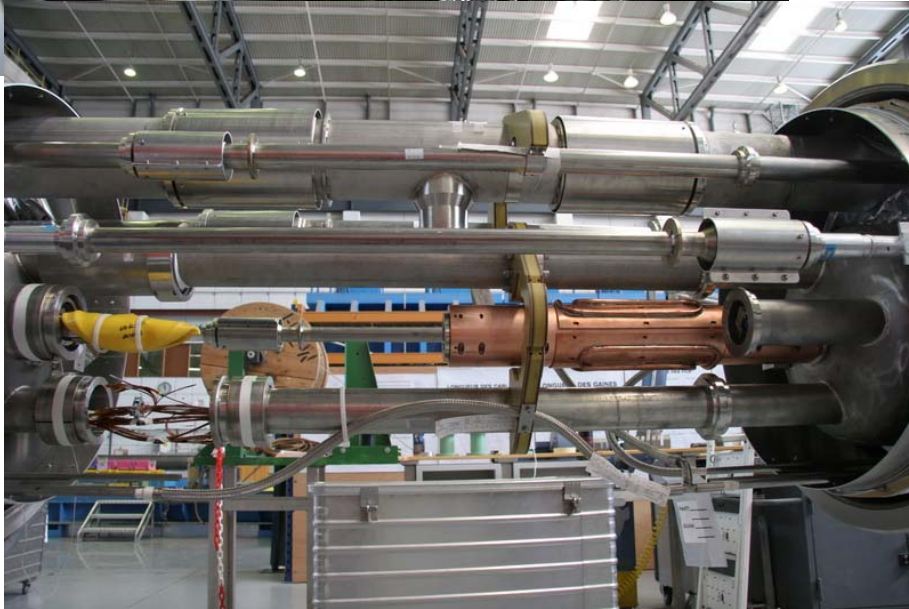


Production Status





Warm Fit Up Status (181 / Meyrin)



rat



Summary

The Fermilab - LHC Accelerator Project will finish construction this year.

The ICB and MTF facilities will be heavily utilized to complete this (LQXB09 cold testing begins today)

Magnet deliveries to CERN are ongoing, and not driving the CERN schedule. The warm fit up currently underway is going well, minor items remain.

The LHC Accelerator Research Program provides a means for continued Fermilab (and US) involvement in:

- Machine commissioning and operation
- Technology (Nb3Sn) upgrades